

IN THE CLAIMS:

The following is a complete listing of the claims in this application, reflects all changes currently being made to the claims, and replaces all earlier versions and all earlier listings of the claims:

Claim 1. (Currently Amended) An information processing device for aiding control operations relating to controlling the position and orientation of a virtual object ~~positioned in three-dimensional space~~, said device comprising:

~~image-taking~~ capturing means for ~~taking~~ capturing a real image ~~images~~ in real space ~~in order to display the virtual object in a superimposed manner on real space~~;

virtual image generation means for generating a virtual image of a virtual object according to the position and orientation of said image capturing means;

superimposed means for superimposing the generated virtual image object with the ~~taken~~ captured real image;

inputting means for ~~obtaining~~ inputting three-dimensional position information of a plurality of positions inputted by a user in the real space;

setting means for setting a constraining shape based on the ~~obtained~~ inputted three-dimensional position information; and

operating means for performing an operation controlling the position and the orientation of the virtual object based on the constraining shape in accordance with ~~the~~ a user's instructions.

Claim 2. (Currently Amended) An information processing device according to Claim 1, wherein the constraining shape is defined by polygons ~~is a plane~~ and the apexes of ~~the polygons thereof~~ are at positions inputted by the user or the constraining shape is a plane passing through the positions inputted by the user.

Claim 3. (Currently Amended) An information processing device according to Claim 1, wherein said operating means performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape; ~~and~~ or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact.

Claim 4. (Canceled)

Claim 5. (Currently Amended) An information processing method for aiding control operations relating to controlling the position and orientation of a virtual object ~~positioned in three-dimensional space~~, said method comprising:

an image ~~taking~~ capturing step of ~~taking capturing a real image~~ images in real space ~~in order to display the virtual object in a superimposed manner on real space;~~

a virtual image generation step of generating a virtual image of a virtual object according to the position and orientation of said image capturing step;

a superimposing step of superimposing the generated virtual image object with the ~~taken~~ captured real image;

an inputting step of ~~obtaining~~ inputting three dimensional position information of a plurality of positions inputted by a user in the real space;

a setting step of setting a constraining shape based on the ~~obtained~~ inputted three dimensional position information; and

an operating step for performing an operation controlling the position and the orientation of the virtual object based on the constraining shape in accordance with ~~the~~ a user's instructions .

Claim 6. (Currently Amended) An information processing method according to Claim 5,

wherein said setting step sets a constraining shape is defined by polygons comprising ~~a plane~~ the apexes of the polygons ~~thereof~~ being at positions inputted by the user in said inputting step or sets a constraining shape comprising a plane passing through the positions inputted by the user in said inputting step.

Claim 7. (Previously Presented) An information processing method according to Claim 6, wherein said operating step comprises the steps of:

causing translational movement of the virtual object based on the constraining shape; and

rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact .

Claim 8. (Currently Amended) A computer program product comprising a computer readable medium storing computer program code for performing the information processing method according to Claim 5, wherein the information processing method ~~according to Claim 5~~ is executed by a computer device.

Claim 9. (Currently Amended) A computer-readable recording medium, storing the computer program code according to Claim 8.

Claim 10. (Currently Amended) An information processing method for changing the position and orientation of a virtual object in mixed reality space obtained by combining a real image and a virtual image, said method comprising the steps of:

obtaining a constraining shape from a plurality of positions in real space designated by a user using an operating unit capable of obtaining three-dimensional positional information;

changing the position and orientation of the virtual object according to instructions from the user, based on the obtained constraining shape as constraint conditions; and

combining an image of the virtual object generated according to the changed position and orientation, and the real image, to obtain a mixed reality image.

Claim 11. (Previously Presented) An information processing method according to Claim 10, further comprising the step of combining a virtual image indicating the constraining shape with the real image.

Claim 12. (Original) An information processing method according to Claim 10, wherein the constraining shape is a plane.

Claim 13. (Previously Presented) An information processing method according to Claim 10, wherein said changing step changing the position and orientation of the virtual object is carried out by changing the position and orientation of the operating unit.

Claim 14. (Currently Amended) A computer program product comprising a computer readable medium storing computer program code for performing the information processing method according to Claim 10, wherein the information processing method ~~according to Claim 10~~ is executed by a computer device.

Claim 15. (Currently Amended) A computer-readable recording medium, storing the computer program code according to Claim 14.

Claim 16. (Currently Amended) An information processing device for aiding control operations relating to controlling the position and orientation of a virtual object ~~positioned in three-dimensional space~~, said device comprising:

an ~~image-taking~~ capturing unit configured to ~~take~~ capture a real image ~~images in real space in order to display the virtual object in a superimposed manner on real space;~~

a virtual image generation unit for generating a virtual image of a virtual object according to the position and orientation of said image capturing unit;

a superimposing unit configured to superimpose the generated virtual image ~~object~~ with the ~~taken~~ captured real image;

an inputting unit configured to ~~obtain~~ input three-dimensional position information of a plurality of positions inputted by a user in the real space;

a setting unit configured to set a constraining shape based on the ~~obtained~~ inputting three-dimensional position information; and

an operating unit configured to control the position and orientation of the virtual object based on the constraining shape in accordance with ~~the~~ a user's instruction.

Claim 17. (Currently Amended) An information processing device according to Claim 16, wherein the constraining shape is defined by polygons ~~is a plane~~ and the apexes of the polygons ~~thereof~~ are at positions inputted by the user or the constraining shape is a plane passing through the positions inputted by the user.

Claim 18. (Currently Amended) An information processing device according to Claim 16, wherein said operating unit performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape; ~~and~~ or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact.

Claim 19. (Canceled)